

April 10, 1974

Mr. Richard B. Bender
Corrosion Associates
P.O. Box 11302
Fort Worth, TX 76110

Dear Mr. Bender:

This responds to your letter of March 14, 1974, requesting a waiver of compliance with 49 CFR 192.457, 192.461, 192.463, and 192.467 for your client, who is unnamed but described as a HUD type 236 apartment project with 88 units built in 1968-1969. The Natural Gas Pipeline Safety Act of 1968 does not authorize us to grant waivers upon application by any person other than a gas operator. Consequently, your request must be denied on procedural grounds. However, we have reviewed the information submitted and offer the following comments.

The gas distribution system for the project consists of coated steel pipe connected to and in contact with bare copper pipe under ground without insulating fittings. The basis for your request is that there have been no leaks and the probability of corrosion is minimal due to high soil resistance. You further state that your client would have to spend an excessive amount of money to comply with the law.

The primary objective of the Federal gas pipeline safety standards is public safety, and cost of compliance is normally not sufficient grounds for a waiver. Moreover, in this instance, you have not shown that the relevant standards are inappropriate for the particular installation. The corrosion current to be protected against in a high resistivity environment is small, and its adverse effect will occur over a long period. However, there is no question that areas of active corrosion exist in the situation you describe with steel and copper lines in contact without electrical isolation. Even though the corrosion problem may not be of an immediate nature--it does exist--and unless it is controlled, public safety could be adversely affected. For these reasons, a waiver of the applicable standards would not be consistent with pipeline safety.

Sincerely,

Joseph C. Caldwell
Director
Office of Pipeline Safety

Richard B. Bender

March 14, 1974

Mr. Joseph C. Caldwell
Office of the Secretary of Transportation
Office of Pipeline Safety
Washington, D.C. 20590

RE: Interpretation effecting
Electrical measurements and
conditions in High resistant
soil environment.

Dear Mr. Caldwell:

We have had a number of conversations with Mr. Heverly regarding a situation that could be rather common in many areas of the country on the Apartment complex (gas company in its own right by your OPS regulation). Whereas the situation might be common in other areas it is a first for this part of the country.

Facts: We are dealing with a HUD type 236 apartment project that has a Master meter then services some 88 units. Built in 1968/69.

The underground gas pipe is coated steel, and is isolated from Lone Star Gas Company's coated steel line at the master meter. Current drainage across this insulating fitting was only 20 micro amps.

The soil resistance varies from 126,000 ohm-cm at depths of 2'7½", 5'3", 7'10", and 10'5½" over 2/3rd of the project and 38,000 ohm-cm at 2'7½', 56,000 ohm-cm at 5'3" up to 126,000 ohm-cm at 7'10" and 10'5½" over the other 1/3rd of the project.

(The coated steel pipe is connected to bare copper pipe) and there are no insulating fitting between the bare copper water lines and the steel coated gas lines. Unfortunately there is no union or stopcock on any of the 88 risers so the installation of insulating fittings on the risers will be expensive, plus the fact that there may be underground contacts between the bare copper water and coated gas lines making it necessary to locate and remove such contacts.

Opinions: Whereas we recognize that an open circuit potential of .50 Volt exist between copper and steel we believe the soil resistance (electrolyte) is so high that the probability of corrosion is minimal. They have had no leaks on the gas system at this time. We admit there is the possibility of corrosion but feel that any compliance with sections 192.457, 192.461 or 192.467 at this time is not fair to the Project owner.

It was unfortunate that the project was not built in accordance with the law (Federal) and was built under a poor city code. Our client wants to do what is right, but to spend as much as he will have to spend to correct the improper initial construction when he is in such high resistant soil does not seem fair.

Request for interpretation:

When the electrical measurements on a system indicate the possibility of a minimal corrosion condition and when there is no leak history is it still necessary to comply with 192.457 (a)(3)(c) 192.463 (b) 1 or 2?

When the electrical measurements on a system indicate the possibility of a minimal corrosion condition and when there is no leak history is it still necessary to comply with 192.467 (a)?

Arguments:

There is no argument that a corrosion potential does not exist between copper and steel pipe when connected together under ground. We do feel however that such a condition in extremely high resistant soil (sandy soil) where little or no viable electrolyte is involved is not a serious corrosion problem.

We feel that there are numerous other areas of the country that can have a similar situation however each situation will have to stand on its own merits.

We feel that the intent of the law is to control corrosion only when corrosion can be definitely proven as a hazardous situation.

We feel that the probability of a corrosion leak on the project in question is remote.

We feel that our client in this instance would have to spend an excessive amount of money in order to comply with the law.

We respectfully request exception of compliance for our client.

Sincerely yours,

Richard B. (Pipe) Bender
Corrosion Specialist
NACE Certification #14

MEMORANDUM

March 29, 1974

SUBJ: Mr. R.B. Bender's letter of March 14, 1974,
requesting interpretation about corrosion
regulatory requirements in high resistant
soil environments
FROM: Assistant Chief, Technical Division
TO: Chief, Technical Division

As requested on your buck slip attached to the subject letter, following are my comments to the questions to be used by Mr. Furrow in answering this letter.

In his letter, Mr. Bender states:

"Opinions: Whereas we recognize that an open circuit potential of .50 Volts exist between copper and steel we believe the soil resistance (electrolyte) is so high that the probability of corrosion is minimal. They have had no leaks on the gas system at this time. We admit there is the possibility of corrosion but feel that any compliance with sections 192.457, 192.461 or 192.467 at this time is not fair to the Project owner."

The corrosion current that will flow is the open circuit voltage divided by resistance path (the usual expression is that resistance equals open circuit voltage divided by short circuit current). The corrosion current in a high resistivity environment will be small and its adverse effect will take longer. With the multishorted condition between bare copper water lines and coated steel gas piping, there is no question but that areas of active corrosion exist (Section 192.457(b)(3) and 192.457(c)). There is also no question that in order to achieve effective corrosion control the dissimilar metals must be electrically isolated (Section 192.467(b)).

Mr. Bender further states:

"Request for interpretations: When the electrical measurements on a system indicate the possibility of a minimal corrosion condition and when there is no leak history is it still necessary to comply with 192.457(a)(3)(c) 192.463(b) 1 or 2?

"When the electrical measurements on a system indicate the possibility of a minimal corrosion condition and when there is no leak history is it still necessary to comply with 192.467(a)?"

Section 192.463(b)(1) does not apply because steel and copper are not amphoteric metals.

Neither Mr. Bender, nor his client, should be concerned with Sections 192.463(b)(2) and 192.467(a) until after compliance with Section 192.467(b) has been attained. The way Mr. Bender describes the soil conditions, my guess is that a survey after the copper water lines and steel gas lines have been electrically isolated will not reveal any problem that cannot be taken care of by the local installation of long magnesium anodes. If the system is well coated, several long magnesium anodes in the 38,000 ohm-cm soil would probably cathodically protect the entire gas piping system.

In his argument summary, Mr. Bender presents good reasons why his client should not be required to comply with OPS regulatory requirements insofar as economics are concerned. However, our concern is primarily that of public safety. As contained in the definition of active corrosion: "continuing corrosion which, unless controlled, could result in a condition that is detrimental to public safety", should be our primary concern. Granted that the corrosion problem in the case cited by Mr. Bender is not an immediate one; however, the problem does exist--just the time element is prolonged.

Lance F. Heverly